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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,081	03/01/2004	Osamu Kakuchi	1232-5317	2984
27123	7590	03/01/2006	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			DETSCHER, MARISSA	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 03/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/791,081

Applicant(s)

KAKUCHI, OSAMU

Examiner

Marissa J. Detschel

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1 and 2 is/are allowed.
- 6) ☒ Claim(s) 3-5 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/04/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 2003-062016, filed on March 7, 2003.

### ***Information Disclosure Statement***

The information disclosure statement filed on October 4, 2004, has been fully considered by the examiner.

### ***Drawings***

Figures 7, 8A, 8B, and 9 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "122" and "123" have both been used to designate a spatial filter in Figure 1. Examiner suggests making reference character "123" point to the half mirror above the spatial filter.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of

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any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Aberration measuring method for projection optical system with a variable numerical aperture in an exposure apparatus".

### ***Claim Objections***

Claim 3 is objected to because of the following informalities:

The phrase "exposuring apparatus" in line 7 of this claim, appearing on page 28 should be "exposure apparatus". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuyama (US 2004/0042094).

In regards to claim 3, Matsuyama discloses an exposure apparatus comprising:

A projection optical system for projecting a pattern formed on a reticle onto a wafer (paragraph 38, lines 4-7), a numerical aperture of said projection optical system being variable (paragraph 80, lines 19-20; and

An aberration measuring system (Figure 8) including:

a condensing optical system (82, 83) disposed on a light incidence side of said projection optical system (PL);

a reflecting optical system (85) disposed on a light emergence side of said projection optical system (PL) (paragraph 103, lines 11-13); and

a detection optical system for detecting wavefront aberration of said projection optical system (PL) as interference fringes (paragraph 103, lines 16-30);

wherein said aberration measuring system causes a light flux converged by said condensing optical system to enter said projection optical system, causes the light flux having passed through said projection optical system to be reflected by said reflecting optical system having a center of curvature at a light convergence point on a light emergence side of said projection optical system to make the light flux incident on said projection optical system again, and forming the interference fringes using the light flux having passed through said projection optical system again (all of paragraph 103);

Matsuyama does not disclose that the aberration measuring optical system sets a numerical aperture of said projection optical system to a numerical aperture larger than a maximum numerical aperture in an actual exposure operation, and measures the wavefront aberration of said projection optical system at the set numerical aperture. However, Matsuyama's apparatus would be capable of performing this task since the apparatus comprises all the pieces capable of doing so. The projection system of the apparatus of Matsuyama has a variable numerical aperture. Therefore, the system

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would be capable of setting the numerical aperture of the projection optical system to any numerical aperture.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the variable aperture of the projection optical system of Matsuyama's apparatus to set the numerical aperture of the projection optical system larger than a maximum numerical aperture in an actual exposure operation in order to gather more of the light being projected through the system, enhancing the wavefront aberration measurement of the apparatus. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233

Regarding claim 4, the exposure apparatus of Matsuyama further comprises a correction means for correcting the wavefront aberration of said projection optical system based on said wavefront aberration measured by said aberration measuring system (paragraph 33, lines 14-25).

In regards to claim 5, Matsuyama discloses using the exposure apparatus disclosed above in claim 3 in a manufacturing method comprising the steps of:

Applying resist on a wafer;

Exposing the wafer on which the resist has been applied using the exposure apparatus; and

Developing said resist that has been exposed. (paragraphs 38 and 39).

***Allowable Subject Matter***

Claims 1 and 2 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: As to claim 1, the prior art of record, taken alone or in combination, fails to disclose or render obvious an aberration measuring method for an optical system utilizing a step of setting a numerical aperture for the optical system to be greater than the maximum operational numerical aperture for the optical system, in combination with the rest of the limitations of claim 1.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marissa J. Detschel whose telephone number is 571-272-2716. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571-272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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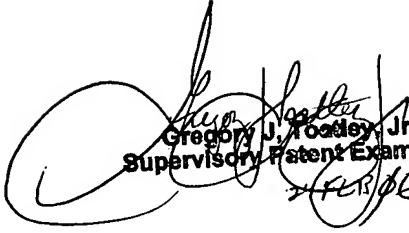
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Marissa J Detschel

MJD

February 23, 2006

  
Gregory J. Rooley, Jr.  
Supervisory Patent Examiner  
2/23/06